



VERNON R. RICE §  
OF COUNSEL



Docket No: 14321.75

\* Admitted only in California  
§ Admitted only in Virginia

A. Additional Materials Required Due to Content of Information Disclosure Statement

Transmitted are the following documents in addition to the Information Disclosure Statement as required variously under 37 C.F.R. § 1.98:

- ☒ Form PTO-1449 listing 12 reference submitted for consideration.
- ☒ A copy of each of the references listed on the Form PTO-1449.
- ☐ English translations of \_\_\_\_ (\_\_\_\_) of the references listed on the Form PTO-1449 which are not in the English language.
- ☐ Copies of the following documents from the prosecution of a previous, related application:
  - ☐ Form PTO-1449 AND INFORMATION DISCLOSURE STATEMENT; and
  - ☐ Form PTO-892

B. Additional Materials Required Due to Timing of Filing of Information Disclosure Statement

The transmitted Information Disclosure Statement is being filed within one (1) of the following four (4) time periods:

- I. ☒ Prior to the later of either three (3) months following the filing date or the mailing of a first Office Action. Accordingly, no materials other than those listed above are enclosed.
- II. ☐ Following the latter of either three (3) months following the filing date or the mailing of a first Office Action, but before the mailing of a final Office Action or a Notice of Allowance. Accordingly, to secure consideration thereof, one (1) of the following is also enclosed:
  - ☐ Promptness Certification; or
  - ☐ Check No. \_\_\_\_\_ in the amount of \_\_\_\_ constituting the submission fee set forth in 37 C.F.R. § 1.17(p).
- III. ☐ After the mailing of a Notice of Allowance, but before payment of the Issue Fee. Accordingly, in order to secure consideration thereof, each of the following are also enclosed:
  - ☐ Promptness Certificate;
  - ☐ Petition for Consideration; and

- \_\_\_ Check No. in the amount of \_\_\_ constituting the petition fee set forth in 37 C.F.R. § 1.17(i)(1).
- IV. \_\_\_ After payment of the Issue Fee. Accordingly, in order to secure consideration thereof, each of the following are also enclosed:
- \_\_\_ Petition to Withdraw from Issue; and
- \_\_\_ Check No. \_\_\_ in the amount of \_\_\_ constituting the petition fee set forth in 37 C.F.R. § 1.17(i)(1).

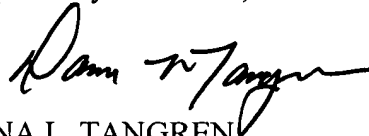
C. Fees

The Commissioner is hereby authorized to charge payment of or any deficiency in the following fees associated with this communication, or to credit any overpayment thereof, to Deposit Account No. 23-3178. A duplicate copy of this letter is enclosed.

- X Any fee required in relation to filing of this letter or any documents transmitted therewith.
- \_\_\_ The submission fee set forth in 37 C.F.R. § 1.17(p) in the event that 37 C.F.R. § 1.97(c) applies and the Examiner is not satisfied that any Promptness Certificate submitted meets the requirements of 37 C.F.R. § 1.97(e).
- \_\_\_ The submission fee set forth in 37 C.F.R. § 1.17(p).
- \_\_\_ The petition fee set forth in 37 C.F.R. § 1.17(i)(1).

Dated this 18<sup>th</sup> day of January 2006.

Respectfully submitted,



DANA L. TANGREN  
Attorney for Applicant  
Registration No. 37,246  
Customer No. 022913  
Telephone No. 801.533.9800



PATENT APPLICATION

Docket No: 14321.75

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Takayuki Mizuno et al.

Serial No.:

10/536,649

Filing Date:

May 27, 2005

Confirmation No.:

2202

For:

INTERFERENCE OPTICAL SWITCH AND  
VARIABLE OPTICAL ATTENUATOR

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) Art Unit  
) 2874  
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CERTIFICATE OF DEPOSIT UNDER 37 C.F.R. § 1.8

I hereby certify that the following documents are being deposited with the United States Postal Service as First Class Mail, postage prepaid, in an envelope addressed to: Commissioner for Patents, PO Box 1450, Alexandria, Virginia 22313-1450, on the 18<sup>th</sup> day of January 2006.

- Transmittal for Information Disclosure Statement (3 pages)
- Information Disclosure Statement (3 pages)
- Form PTO-1449 listing 12 references (2 pages)
- A copy of each of the references listed on the Form PTO-1449
- Postcard

Respectfully submitted,

DANA L. TANGREN

Attorney for Applicant

Registration No. 37,246

Customer No. 022913

Telephone No. 801.533.9800

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PATENT APPLICATION

Docket No: 14321.75

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of		)
		)
	Takayuki Mizuno et al.	)
		)
Serial No.:	10/536,649	) Art Unit
		) 2874
Filing Date:	May 27, 2005	)
		)
Confirmation No.:	2202	)
		)
For:	INTERFERENCE OPTICAL SWITCH AND	)
	VARIABLE OPTICAL ATTENUATOR	)

INFORMATION DISCLOSURE STATEMENT  
UNDER 37 C.F.R. § 1.97

Commissioner for Patents  
PO Box 1450  
Alexandria, Virginia 22313-1450

Sir:

Please find, pursuant to 37 C.F.R. § 1.98(a)(1), the enclosed Form PTO-1449 which contains a list of all patents, publications, or other items that have come to the attention of one or more of the individuals designated in 37 C.F.R. § 1.56(c). While no representation is made that these references may be "prior art" within the meaning of that term under 35 U.S.C. §§ 102 or 103, the enclosed listed references are disclosed so as to fully comply with the duty of disclosure set forth in 37 C.F.R. § 1.56.

Moreover, while no representation is made that a specific search of office files or patent office records has been conducted or that no better art exists, the undersigned attorney of record believes that the enclosed art is the closest to the claimed invention (taken in its entirety) of which the undersigned is presently aware, and no art which is closer to the claimed invention (taken in its entirety) has been knowingly withheld.

In accordance with 37 C.F.R. §§ 1.97 and 1.98, a copy of each of the listed references or relevant portion thereof that is not a US patent document is also enclosed.

Statement of Relevance of References Listed  
Unaccompanied by English Translation  
Under 37 CFR § 1.98(a)(3)

In accordance with 37 CFR § 1.98(a)(3), the following concise explanation of the relevance of each listed reference that is not in the English language and unaccompanied by a translation into English is provided.

Japanese Patent Publication No. JP 5-061077: PURPOSE: To obtain a waveguide type optical switch whose wavelength dependency is small in a desired wavelength area. CONSTITUTION: Two directional couplers 22a, 22b and 23a, 23b are coupled with optical waveguides 22c, 22d and 23c, 23d whose length are slightly different from each other, and sub-phase shifters 22e, 22f and 23e, 23f are provided on the optical waveguides so as to constitute Mach-Zehnder optical interferometer type 3dB optical couplers 22, 23, and main phase shifters 24a, 25a are provided on the optical waveguides 24, 25 between the optical couplers 22, 23. By simultaneously controlling the main and sub phase shifters, the optical switch whose wavelength dependency is small can be provided.

Japanese Patent Publication No. JP 6-051354: PURPOSE: To obtain the optical switch which is tolerant to the coupling rate setting error of a directional coupler and has a superior extinction ratio by composing an optical switch element of three optical waveguides, i.e., by-pass optical waveguides in addition to input optical waveguides and output optical waveguides and including two Mach-Zehnder optical interferometer circuits which have an optical path length difference equivalent to a 1/2 wavelength in an OFF state in the optical waveguide element. CONSTITUTION: Parts of the by-pass optical waveguides 33a and 33b come close to the input waveguides 31a and 31b at two places to constitute two directional couplers 34a and 35a. Similarly, other parts of the by-pass optical waveguides 33a and 33b come close to the output optical waveguides 32a and 32b at two places to constitute two directional couplers 34b and 35b. Then the 1<sup>st</sup> and 2<sup>nd</sup> Mach-Zehnder optical interference circuits 38a and 38b which have the optical path length difference of 1/2 wavelength in the OFF state are provided. Therefore, the two couples of directional couplers 34a and 35a, and 34b and 35b are coupled in mutually opposite-phase relation to each other and their coupling operations cancel each other.

Japanese Patent Publication No. JP 8-122545: PURPOSE: To extend one band without narrowing the other band. CONSTITUTION: In the waveguide type optical multiplexer/demultiplexer which allows light of the band including wavelengths  $\lambda_1$  and  $\lambda_3$  to pass through and couples light of the band including a wavelength  $\lambda_2$ , waveguide length differences  $\Delta L_1$  and  $\Delta L_2$  of phase difference giving parts 11, 14, and 17 and a coupling rate  $\kappa(\lambda_2)$  of the wavelength  $\lambda_2$  of directional couplers 5 to 8 satisfy conditional formulas  $\Delta L_1 = (N_1 \pm 0.5) \lambda_3 / n_{\text{eff}}(\lambda_3)$ ,  $P_c(\lambda_2) = 4 \kappa(\lambda_2) \{1 - \kappa(\lambda_2)\} \cos\{2n_{\text{eff}}(\lambda_2) p \Delta L_1 / \lambda_2\} = 0.5$ ,  $2N_2 = \lambda_1 / n_{\text{eff}}(\lambda_1) \mp \lambda_1 / n_{\text{eff}}(\lambda_1) - \lambda_2 / n_{\text{eff}}(\lambda_2) \mp$ , and  $\Delta L_2 = (N \pm 0.5) \lambda_1 / n_{\text{eff}}(\lambda_1) = N \lambda_2 / n_{\text{eff}}(\lambda_2)$  where  $N_1$  and  $N_2$  are integers and  $n_{\text{eff}}(\lambda)$  is the equivalent refractive index of waveguides 2 and 3 to light of the wavelength  $\lambda$ .

Dated this 18<sup>th</sup> day of January 2006.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Dana L. Tangren', with a stylized, flowing script.

Dana L. Tangren  
Attorney for Applicant  
Registration No. 37,246  
Customer No. 022913  
Telephone No. 801.533.9800

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Applicant: Takayuki Mizuno et al.

Confirmation No.: 2202

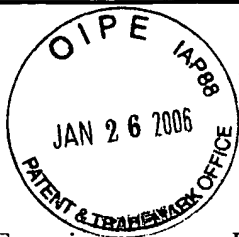
Serial No.: 10/536,649

Att'y Docket No.: 14321.75

Filing Date: May 27, 2005

Art Unit: 2874

For: INTERFERENCE OPTICAL SWITCH AND VARIABLE OPTICAL ATTENUATOR

INFORMATION DISCLOSURE CITATIONS MADE BY APPLICANTU.S. Patent Documents

Examiner Initial*	Document Number	Issue Date	Name
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Foreign Patent Documents

Examiner Initial*	Document Number	Publication Date	Country or Patent Office	Translation
___ 1	05-061077	03/12/1993	Japan	No
___ 2	06-051354	02/25/1994	Japan	No
___ 3	08-122545	05/17/1996	Japan	No
___ 4	0 382 461 A2	08/19/1990	EPO	N/A

Other Documents

(including author, title, pertinent pages, etc.)

Examiner  
Initial\*

- \_\_\_ 5 Masayuki Okuno et al., *Low-Loss and High Extinction Ratio Silica-Based 1 x N Thermo-Optic Switches*, OECC/IOOC 2001 Conference Incorporating ACOPT, July 5, 2001, pp. 39-41.
- \_\_\_ 6 Takashi Goh et al., *High-Extinction Ratio and Low-Loss Silica-Based 8 x 8 Thermo-optic Matrix Switch*, IEEE Photonics Technology Letters, Vol. 10, No. 3, March 1998, pp. 358-360.
- \_\_\_ 7 S. Sohma et al., *Low Switching Power Silica-Based Super High Delta Thermo-Optic Switch with Heat Insulating Grooves*, Electronics Letters, Vol. 38, No. 3, January 31, 2002, pp. 127-128.
- \_\_\_ 8 Takashi Goh, *Low-Loss and High-Extinction-Ratio Silica-Based Strictly Nonblocking 16 x 16 Thermo-optic Matrix Switch*, IEEE Photonics Technology Letters, Vol. 10, No. 6, June 1998, pp. 810-812.

Examiner:

Date Considered:

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609, draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



Applicant: Takayuki Mizuno et al.

Confirmation No.: 2202

Serial No.: 10/536,649

Att'y Docket No.: 14321.75

Filing Date: May 27, 2005

Art Unit: 2874

For: INTERFERENCE OPTICAL SWITCH AND VARIABLE OPTICAL ATTENUATOR

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- \_\_\_\_\_ 9 Toshio Watanabe et al., *Silica-based PLC 1 x 128 Thermo-Optic Switch*, 27<sup>th</sup> European Conference on Optical Communication 2001, ECOC '01, Vol. 2, pp. 134-135.
- \_\_\_\_\_ 10 Kaname Jinguji et al., *Two-Port Optical Wavelength Circuits Composed of Cascaded Mach-Zehnder Interferometers with Point-Symmetrical Configurations*, Journal of Lightwave Technology, Vol. 14, No. 10, October 1996, pp. 2301-2310.
- \_\_\_\_\_ 11 Masayuki Okuno et al., *Birefringence Control of Silica Waveguides on Si and Its Application to a Polarization-Beam Splitter/Switch*, Journal of Lightwave Technology, Vol. 12, No. 4, April 1994, pp. 625-633.
- \_\_\_\_\_ 12 Takayuki Mizuno et al., *Mach-Zehnder Interferometer with a Uniform Wavelength Period*, Optics Letters, Vol. 29, No. 5, March 2004, pp. 454-456.

### References Cited by Applicants

While the filing of Information Disclosure Statements is voluntary, the procedure is governed by the guidelines of Section 609 of the Manual of Patent Examining Procedure and 37 C.F.R. §§ 1.97 and 1.98. To be considered a proper Information Disclosure Statement, Form PTO-1449 shall be accompanied by a copy of each listed patent or publication or other item of information and a translation of the pertinent portions of foreign documents (if an existing translation is readily available to the applicant), an explanation of relevance of each reference not in the English language, and should be submitted in a timely manner as set out in MPEP Sec. 609.

Examiners will consider all citations submitted in conformance with 37 C.F.R. § 1.98 and MPEP Sec. 609 and place their initials adjacent the citations in the spaces provided on this form. Examiners will also initial citations not in conformance with the guidelines which may have been considered. A reference may be considered by the Examiner for any reason whether or not the citation is in full conformance with the guidelines. A line will be drawn through a citation if it is not in conformance with the guidelines AND has not been considered. A copy of the submitted form, as reviewed by the Examiner, will be returned to the applicant with the next communication. The original of the form will be entered into the application file.

Each citation initialed by the Examiner will be printed on the issued patent in the same manner as references cited by the Examiner on Form PTO-892.

The reference designations "A1," "A2," etc. (referring to Applicant's reference 1, Applicant's reference 2, etc.) will be used by the Examiner in the same manner as Examiner's reference designations "A," "B," "C," etc. on Office Action Form PTO-1142.

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Examiner:Date Considered:

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\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609, draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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